Amendments to the Drawings:

The attached sheet of drawings includes changes to 2a, 2b and 11. This sheet, which includes Fig. 2a, 2b and 11, replaces the original sheet including Fig. 2a, 2b and 11.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

Claims 23-26 as elected on November 18, 2005 remain in this application. The Examiner has erroneously stated that claim 26 is withdrawn from consideration in paragraph 4 of the Office Action.

FIG. 2b is now re-labeled by adding "prior art" after the figure numbering. The numerals 17, 18 and 19 in FIG. 11 are corrected to 27, 28 and 29, respectively, as pointed out correctly by the Examiner.

In paragraph 12 of the Office Action, the Examiner states that a certified foreign priority document was not received by the USPTO. The certified Singapore priority application no. 9804027-2 was filed on March 24, 2006. Kindly confirm safe receipt of same.

In the Office Action, the Examiner rejected claims 23 and 25 under 35 USC 102(b) as anticipated by the Northrup patent '583 and under 35 USC 103(a) in view of the Plumb patent '352. However, the Examiner acknowledges that claim 24 is patentably distinguished from the Northrup and Plumb patents and that it would be allowed if re-written as an independent claim.

The present invention as defined claim 23-26 relates to post-growth tuning of the optical bandgap of a semiconductor heterostructure. The method involves forming an oxide layer on a top surface of a heterostructure; depositing at least one metal interlayer on at least one region of the oxide layer; depositing a dielectric layer onto said heterostructure and post-annealing the heterostructure. In the description, page 9, line 2 through to page 10, line 19, the advantages of providing the oxide layer are explained.

The Northrup patent '583 discloses a method of forming a p-type impurity induced layer disordering on a semiconductor heterostructure. The method involves diffusing/doping a disordering agent (such as silicon or germanium) onto a surface of the heterostructure and annealing the heterostructure in a gallium-rich atmosphere. In one embodiment, a cap layer (36) is formed on the silicon diffusion source layer (see column 2, lines 44-52; and column 5, lines 39-47); in another embodiment, a cap layer is not formed (see column 5, lines 65-68; and column 6, lines 48-54).

The Plumb patent '352 discloses a method of forming a ridge waveguide laser structure from a semiconductor heterostructure. The method involves a first lithographic step of forming a window (6) in a silicon dioxide layer (5) on the top surface of the heterostructure to expose a cap layer (4); a second lithographic step of forming a photoresist stripe (8) on the exposed area of the cap layer (4); etching channels (9) through the cap layer (4) and a passive layer (3) using the photoresist stripe (8) and silicon dioxide layer (5) window as a mask; evaporating a passivating and insulating oxide (11, 11a) over the heterostructure with breaks (C) in the passivating and insulating oxide where the photoresist stripe (8) is undercut during channel etching; removing both the photoresist stripe (8) and the passivating/insulating oxide (11a) on the ridge; and metallizing (13, 14) the top and bottom surfaces of the heterostructure.

Applicant respectfully disagrees with the Examiner's rejections. Northrup does not disclose forming an oxide layer on a top surface of a semiconductor heterostructure, depositing at least one metal interlayer on at least one region of the oxide layer, and depositing a dielectric layer over the heterostructure and post-annealing the entire heterostructure to post-growth tune the bandgap of the heterostructure. As such, the Office Action rejection under 35 USC 102(b) is traversed.

As Applicants now consider claim 23 to be novel over Northrup, Applicants respectfully submit that claim 24 need not be re-written in independent form.

As discussed above, Northrup discloses the cap layer (36) as an optional layer, while Plumb discloses the silicon dioxide (5) as a photolithographic mask. Even if the Examiner considers the cap layer (36) of Northrup and the silicon dioxide layer (5) of Plumb as equivalent to the dielectric layer (11, 101), Applicants respectfully submit that the teaching of Plumb combined with that of Northrup does not render the present invention recited by claims 23-26 obvious under 35 USC 103(a). Clearly, Plumb does not teach any post-growth annealing of a heterostructure, nor does it provide a hint for post-growth tuning of a bandgap of the heterostructure. Even if the Examiner attempts to combine the use of the insulating oxide (11, 11a) as taught by Plumb with the matter disclosed in Northrup, the insulating oxide (11a) in Plumb teaches away from the present invention, in that the insulating oxide (11a) in Plumb is

removed from the ridge (10) before the final step of metallizing (13) the heterostructure. Further, Plumb does not teach or suggest the use of an oxide layer on the top layer of the heterostructure to provide controllability and reproducibility in post-growth tuning of the bandgap of the heterostructure. Assuming one having ordinary skill in the art were to consider the silicon dioxide layer (5) as equivalent to the oxide layer of the present invention, the silicon dioxide layer (5) still teaches away from the present invention in that a window (6) is opened/formed in the silicon dioxide layer (5). Moreover, Northrup does not teach or suggest providing a method for controlling and stabilizing the bandgap tuning of the heterostructure. For the foregoing reasons, Applicants respectfully submit that the teachings of Plumb cannot be combined with the teaching of Northrup to arrive at the present invention; as such, the grounds of rejection under 35 USC 103(a) are traversed.

Accordingly, Applicants respectfully submit that the subject matter of claims 23-26 is novel and unobvious in light of the Northrup and Plumb patents and respectfully request reconsideration and withdrawal of rejections in this Office Action, and prompt issuance of the notice of allowance. If the Examiner has any alternative suggestions, a telephone call to the undersigned would be appreciated.

Respectfully submitted,
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